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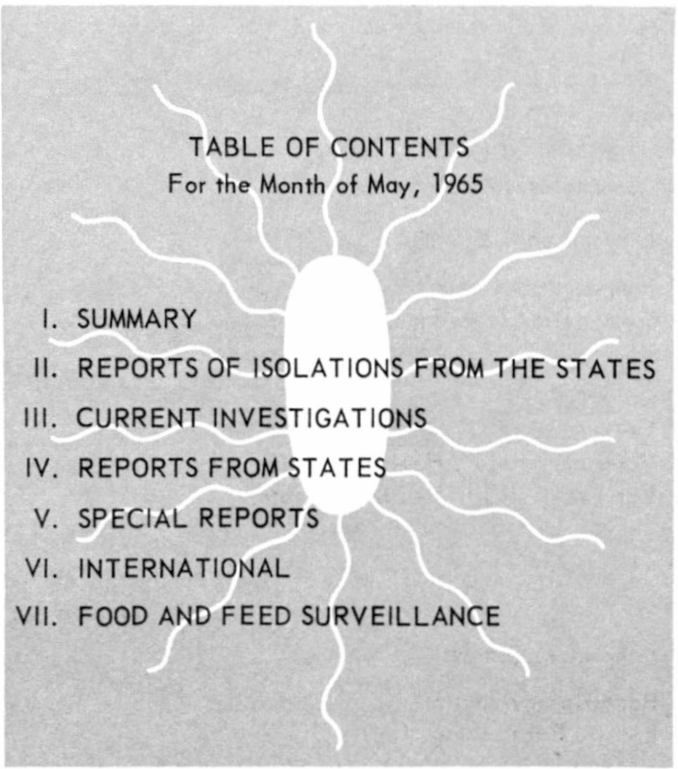
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# **SALMONELLA**

## **SURVEILLANCE**

TABLE OF CONTENTS  
For the Month of May, 1965

- 
- I. SUMMARY
  - II. REPORTS OF ISOLATIONS FROM THE STATES
  - III. CURRENT INVESTIGATIONS
  - IV. REPORTS FROM STATES
  - V. SPECIAL REPORTS
  - VI. INTERNATIONAL
  - VII. FOOD AND FEED SURVEILLANCE

# PREFACE

Summarized in this report is information received from State and City Health Departments, university and hospital laboratories, the National Animal Disease Laboratory (USDA, ARS), Ames, Iowa, and other pertinent sources, domestic and foreign. Much of the information is preliminary. It is intended primarily for the use of those with responsibility for disease control activities. Anyone desiring to quote this report should contact the original investigator for confirmation and interpretation.

Contributions to the Surveillance Report are most welcome. Please address to:

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# TABLE OF CONTENTS

	<u>Page</u>
I. SUMMARY	1
II. REPORTS OF ISOLATIONS FROM THE STATES	1
A. Human	1
B. Nonhuman	1
III. CURRENT INVESTIGATIONS	2
A. Water-Borne Epidemic of <u>Salmonella typhi-murium</u> Gastroenteritis.	2
B. Interstate Outbreak of Gastroenteritis Due to <u>Salmonella</u> <u>meleagridis</u> in the Area of Washington, D.C.	4
IV. REPORTS FROM THE STATES	4
A. Minnesota - Human Salmonellosis Traced to an Infected Horse.	4
B. New Jersey - <u>Salmonella enteritidis</u> Infection in a Junior High School.	5
V. SPECIAL REPORTS	6
Salmonella Isolates from Nonhuman Sources Identified by the New York State Veterinary College During 1964.	6
VI. INTERNATIONAL	7
Report of Isolations of Salmonella Organisms in Belgium During the Year 1964.	7
VII. FOOD AND FEED SURVEILLANCE	
None.	

## I. SUMMARY

During May a total of 1,681 isolations of salmonellae from human sources were reported to the Salmonella Surveillance Unit for an average weekly total of 421. This represented an increase of 103 isolations per week over April 1965, and an increase of 59 isolations per week over May 1964. This increase conforms to the seasonal pattern of salmonellosis noted in this country during 1963 and 1964.

Included in this report is a preliminary report of an extensive outbreak of Salmonella typhi-murium gastroenteritis in Riverside, California involving an estimated 18,000 persons. Salmonella typhi-murium was isolated from water samples obtained from 6 locations within the city. This water-borne outbreak of salmonellosis represents the first such outbreak in this country which has been traced to a communal water supply.

## II. REPORTS OF ISOLATIONS FROM THE STATES

### A. Human

The seven most commonly reported serotypes from human sources during May were:

<u>Rank</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>	<u>Rank Last Month</u>
1	<u>S. typhi-murium</u> & <u>S. typhi-murium</u> <u>var. copenhagen</u>	546	32.5	1
2	<u>S. heidelberg</u>	141	8.4	2
3	<u>S. infantis</u>	87	5.2	4
4	<u>S. enteritidis</u>	79	4.7	6
5	<u>S. newport</u>	78	4.6	5
6	<u>S. derby</u>	78	4.6	3
7	<u>S. typhi</u>	58	3.5	7
Total		1,067	63.5	

Total salmonellae isolated (May) 1,681

The sex and age distribution is consistent with past experience (Table IV). These seven serotypes accounted for 63.5 per cent of the total human isolations.

### B. Nonhuman

There were 476 isolations of salmonella from nonhuman sources reported in May. This is an increase of 61 from the previous month.

The seven most common serotypes reported for May were as follows:



<u>Rank</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>	<u>Rank Last Month</u>
1	<u>S. typhi-murium</u> & <u>S. typhi-murium</u> <u>var. copenhagen</u>	78	16.4	1
2	<u>S. heidelberg</u>	57	12.0	2
3	<u>S. pullorum</u>	33	6.9	Not Listed
4	<u>S. infantis</u>	24	5.0	4
5	<u>S. give</u>	23	4.8	3
6	<u>S. anatum</u>	21	4.4	6
7	<u>S. livingstone</u>	20	4.2	Not Listed
		256	53.7	

These seven types accounted for 53.7 per cent of the total number of nonhuman isolations reported.

The four species from which most of the isolations were obtained in order of frequency were: turkeys, 139 (29.2 per cent); chickens, 131 (27.2 per cent); cattle, 27 (5.7 per cent); and swine, 21 (4.4 per cent).

During the month of May, a total of 19 isolations (4.0 per cent) were made from the Easter novelty item - stuffed ducks and chicks. (See SSR #36 and #37) Serotypes isolated were S. give, 9; S. livingstone, 7; S. bareilly, 1; S. enteritidis, 1; and untypable group B<sub>1</sub>.

A very rare serotype, S. siegburg, was isolated from meat scraps and bone meal in Michigan.

### III. CURRENT INVESTIGATIONS

- A. Water-Borne Epidemic of Salmonella typhi-murium Gastroenteritis (Preliminary Report). Reported by Philip Condit, M.D., Director, Division of Communicable Diseases, California State Department of Public Health, Everett Stone, M.D., Director, Riverside County Health Department, Riverside, California, and a team from the Communicable Disease Center.

During mid-May 1965, as a result of phone notification from local physicians and increased numbers of stool specimens submitted to the laboratory for identification, the health authorities of Riverside, California became aware of a large outbreak of gastroenteritis within their city. The clinical syndrome observed among cases affected by this epidemic was protean. In children fever of 102 to 103°F. commonly accompanied the severe diarrhea which was often bloody. Adults often stated that severe cramping was the only manifestation of their illness, although children within their families were more severely affected. In both children and adults, the duration of the illness varied with severity, lasting 10 days or longer in the most severe cases. Salmonella typhi-murium was isolated from over 100 of the cases from whom stool cultures were obtained.

Scrutiny of absentee records of Riverside and surrounding school areas and phone surveys of physicians in the same geographic districts suggested that the epidemic occurred primarily in the city proper with the highest attack rates evident in the northern areas. An intensive telephone survey of 47 early cases, none of whom had had prior contact with any known cases of gastroenteritis, was conducted to determine a possible common source. This group was chosen from cases reported by physicians. It included all age groups and was representative of all geographic areas within the city. Of these 47 early cases, 37 submitted stool specimens and 36 of these were positive for Salmonella typhi-murium. Detailed food histories, which included careful examination of purchasing and consumption practices for items which have been

incriminated in the past as being the principal sources of salmonella were obtained. No uniformity in the pattern of food consumption or social contact could be detected in this selected group. Such widely used items as milk and eggs were eliminated by the diverse sources of these items and the significantly large number of infants who had never consumed them.

The estimated attack rate for the Riverside community, consisting of approximately 110,000 persons, was 12.7 per cent (14,000 cases). It is estimated that 2,000 cases occurred in areas contiguous with Riverside. The epidemic curve estimated from the sample survey is presented in Figure 2. These data suggest that the epidemic began between the 15th and 21st days of May, after which it rapidly reached a peak by the 26th of May, followed by slow decline. At least 2,000 secondary cases are thought to have occurred. The age specific attack rates were striking in their uniformity and appear below:

<u>Age group</u> (years)	<u>Per Cent</u>
Under 1	22.0
1-4	18.7
5-9	14.3
10-14	14.6
15-19	12.5
20-39	11.1
40-59	12.3
Over 60	8.7

In contrast to the Riverside city experience, estimated attack rates were markedly lower in the surrounding but contiguous townships. The distinguishing characteristic of these townships was their separate water supply and delivery systems.

Thus, the localized geographic pattern, the lack of a common food source, and the epidemiologic characteristics of this outbreak suggested that the source was water. The water supply of the city consists of two main deep well sources (with several other smaller deep well sources which can be utilized at peak demand) which lead to a gravity feed system. A network of storage reservoirs and associated pumping stations maintains adequate delivery pressure in homes located in elevated portions of the city. Daily water samples have been obtained for estimation of coliform counts in this unchlorinated water system for many years at various points throughout the city. These counts were not reported elevated before and during the outbreak. Water samples were collected from scattered points over the city between May 30 and June 2. Salmonella typhi-murium was isolated from 6 of these samples. Bacteriophage typing of these isolates and a proportion of those isolated from patients revealed that both isolates from patients and water were Salmonella typhi-murium phage type 2, thus confirming the epidemiologic significance of the isolates from water.

On June 2, chlorination of the municipal water system was begun. Intensive efforts are underway to locate the source of contamination of the water system, but as yet, such a source has not been identified.

Editor's Comment: This epidemic represents not only the largest single common source epidemic of salmonellosis recorded with some 18,000 cases, but it also represents the first such outbreak in this country which has been traced to a communal water supply. Investigation of the many questions raised by this outbreak should vastly increase our knowledge of the behavior of salmonellosis within open communities. Periodic reports of these investigations will be published in subsequent Salmonella Surveillance Reports.

- B. Interstate Outbreak of Gastroenteritis Due to Salmonella meleagridis in the Area of Washington, D.C. (Preliminary Report). Reported by Murray Grant, M.D., Director of Public Health, Frederick C. Heath, M.D., Deputy Director of Public Health, Charles Hayman, M.D., Associate Director for Preventive Services, District of Columbia Department of Public Health; Roy P. Lindgren, M.D., Director, Montgomery County Health Department, Montgomery County, Maryland; Daniel Finucane, M.D., Director, Prince Georges County Health Department, Prince Georges County, Maryland; John H. Janney, M.D., Chief of Epidemiology, Maryland Department of Health; Ralph Beachley, M.D., Director, Arlington County Health Department, Arlington County, Virginia; J. D. Kenley, M.D., Section of Epidemiology, Virginia State Department of Health; Arnold Kaufmann, D.V.M., Investigations Section, CDC; Jay W. Smith, M.D., EIS Officer assigned to Johns Hopkins University School of Medicine; and Paul D. Stolley, M.D., EIS Officer assigned to State of Maryland.

Investigation of a large interstate outbreak of gastroenteritis due to Salmonella meleagridis is currently under investigation in the metropolitan Washington, D.C. area. Over 350 cases have been reported with onsets between May 11 and June 8. Cases are known to have occurred in the District of Columbia, Maryland, New Jersey, and Virginia. Illness has in general been mild; only three persons have required hospitalization and there have been no deaths. The clinical symptomatology has been that of moderately severe diarrhea, cramping abdominal pain, and low grade fever. Bloody diarrhea was not a part of the clinical picture. Incubation periods ranged from 12 to 36 hours. Among ill persons, who have submitted cultures, S. meleagridis has been recovered in over 30 instances.

Investigations to date indicate that the common source in this outbreak is a large restaurant-delicatessen in Washington, D.C. This is a large establishment, employing approximately 100 persons, offering food services on the premises, retail food sale, and catering services. All cases reported to date had consumed food from this establishment either in the restaurant or at private parties catered from the delicatessen. Salmonella meleagridis has been recovered from a wide variety of foodstuffs originating in this delicatessen-restaurant. These include coleslaw, sliced salami, corned beef, roast beef, turkey, and "pigs-in-a-blanket." Over 45 persons employed as food handlers in this establishment have been identified as excretors of S. meleagridis; only one of these has admitted to clinical illness. Extensive environmental cultures have been obtained within this establishment, yielding S. meleagridis from one of five meat slicers and a food grinder.

It is postulated that S. meleagridis was introduced into this delicatessen by either food or a carrier, and subsequently spread to many food handlers (approximately 50 per cent) and to food items, as well as contaminating the environment. This significant degree of general contamination resulted in spread of the organism to customers, of which at least 350 developed symptoms of salmonellosis.

The delicatessen-restaurant was closed for two weeks and an extensive revision of the physical plant instituted. All employees will be required to have two consecutive rectal swabs negative for salmonella before returning to work.

#### IV. REPORTS FROM THE STATES

##### A. Minnesota

Human Salmonellosis Traced to an Infected Horse. Reported by E. A. Usenik, Professor, Department of Veterinary Surgery and Radiology, University of Minnesota, and Leslie P. Williams, Jr., D.V.M., Veterinary Epidemiologist, State of Minnesota Department of Health.

In December 1964, a horse was admitted to the animal clinic of the College of Veterinary Medicine, University of Minnesota, with a history of severe diarrhea of two weeks duration. Salmonella typhi-murium was isolated from fecal cultures. The mare remained in the clinic for approximately three weeks. During this time, a veterinary student who had been in contact with the horse developed severe diarrhea and was hospitalized in the student health service. Salmonella typhi-murium was isolated from his stool cultures. Both the isolate from the student and the horse typed a uniform variation of phage type 1a. The student stated that he had had no contact with the horse's excreta but on several occasions had been soiled by blood during venupuncture.

Stool cultures were obtained from 13 veterinary students who had had contact with the horse. None of these specimens yielded salmonellae.

#### B. New Jersey

Salmonella enteritidis Infection in a Junior High School. Reported by William J. Dougherty, M.D., Director, Division of Preventable Diseases, Department of Health, Trenton, New Jersey.

On April 25, 1965, approximately 130 students and parents attended a banquet at a junior high school in Jersey City, New Jersey, at which time a menu consisting of ham, roast beef, salami, capicola, cheese, potato salad, coleslaw, rolls, cake and soda was served. The meal, prepared by a local caterer, was served in buffet style.

Within 24 hours following the meal, approximately 50 per cent of the people attending the banquet became ill with diarrhea, vomiting, fever, abdominal pain and weakness. Three persons were hospitalized but no deaths occurred. Rectal swabs were obtained from 51 students who attended the banquet and stool specimens were obtained from approximately 15 family members who attended the banquet and became ill subsequent to the suspect meal. Ten of the 66 cultures were positive for Salmonella enteritidis. Food histories were obtained from 113 persons who were present at the dinner, and the results of this questionnaire suggested roast beef as the vehicle of infection. None of the roast beef was available for culture.

Four people were associated with the preparation, handling and serving of the food. One of these, the wife of the chef, experienced a diarrheal episode approximately four days subsequent to the outbreak. None of the other food handlers gave a history of recent illness. Salmonella enteritidis was isolated from the daughter of the chef, whose main job was arranging the assorted sliced meats on platters. A sanitary inspection of the caterer's kitchen revealed many major deficiencies. The caterer was required to discontinue his operation until the deficiencies were corrected.

Approximately 150 pounds of roast beef, in 9-pound pieces, were cooked for two and a half hours at 425°F. on the morning preceding the banquet. The beef was cooled for a short time at room temperature and then refrigerated. As orders were prepared during the weekend, the necessary number of pieces were removed from the refrigerator, sliced on an electric slicer, arranged on platters and put back in the refrigerator until delivery time.

A station wagon was used to transport all the food from the caterer to the school, with no refrigeration being provided during the one-half hour trip. The food was delivered to the school at approximately 5:00 PM and tables were arranged for serving buffet style. The meal began at approximately 6:00 PM. Everyone had finished eating by 7:15 PM. After the meal, tables were cleared and the remaining food was consolidated on several platters and placed back on the tables for snack purposes throughout the evening. The food was finally removed at approximately 9:00 PM.

At the conclusion of the investigation it was apparent that there had been a major breakdown in food handling technique. An unclean kitchen, long periods of time when food was not under refrigeration, and a food handler infected with Salmonella enteritidis created a perfect setting for a potentially dangerous situation.

#### V. SPECIAL REPORTS

Salmonella Isolates from Nonhuman Sources Identified by the New York State Veterinary College During 1964. Reported by D. W. Bruner, D.V.M., Department of Pathology and Bacteriology, New York State Veterinary College.

During the year 1964, 253 salmonella cultures were sent to the New York State Veterinary College Laboratory for serotyping. These 253 isolates were obtained from nine different nonhuman sources. Twenty-two different serotypes were identified. Salmonella typhi-murium was the most frequently isolated serotype from all but one of the sources. A tabulation of the sources and serotypes identified from each source is listed below:

Salmonella	Chickens	Ducks	Turkeys	Pigeons	Pheasant	Swine	Horses	Cattle	Dogs	Cats
typhi-murium	10	115	7	35*	2	3	3	3	1	1
pullorum	10									
thompson	8									
anatum		7								
infantis	4		2							
enteritidis	3									
give	1		4							
litchfield		4								
newington		4								
panama			3							
senftenberg	2	1								
saint-paul	1		2							
manhattan	1	1								
california	1		1							
blockley	2									
schwarzengrund	2									
heidelberg		1								
montevideo	1									
cerro			1							
worthington									1	
kentucky	1									
newport									1	

\* 4-variants. There were two cultures of Salmonella enteritidis from man and one of Salmonella typhi.

## VI. INTERNATIONAL

Report of Isolations of Salmonella Organisms in Belgium During the Year 1964. Reported by Dr. E. van Oye, Ministry of Public and Family Health, Brussels, Belgium.

A total of 2,087 isolations of salmonella organisms were made in Belgium in 1964, in contrast with 1,552 in 1963 and 990 in 1962. These 2,087 isolations represent 55 different serotypes including 15 which have been isolated for the first time from humans in Belgium during the past year, and two entirely new salmonella serotypes, S. etterbeek and S. kitenge.

The seven most commonly isolated serotypes in Belgium in 1964 were as follows:

<u>Rank</u>	<u>Serotype</u>	<u>Number</u>	<u>Per Cent</u>
1	<u>S. typhi-murium</u>	1336	64.1
2	<u>S. panama</u>	325	15.5
3	<u>S. brandenburg</u>	115	5.5
4	<u>S. bovis-morbificans</u>	60	2.8
5	<u>S. stanley</u>	39	1.8
6	<u>S. heidelberg</u>	31	1.5
7	<u>S. muenchen</u>	23	1.1

As in previous years, S. typhi-murium is by far the most frequently encountered serotype. Salmonella panama was first noted in Belgium in 1962 and since then has shown a steady increase, with reports from all areas of the country.

### Nonhuman isolations for 1964:

The following serotypes were identified from nonhuman sources during 1964:

<u>Serotype</u>	<u>Sources</u>	<u>Serotype</u>	<u>Sources</u>
<u>S. abortus-equi</u> :	horses	<u>S. lindenberg</u> :	cattle
<u>S. bovis-morbificans</u> :	pigs	<u>S. livingstone</u> :	pigeons
<u>S. brandenburg</u> :	pigs	<u>S. new castle</u> :	cattle
<u>S. dublin</u> :	cattle & birds	<u>S. panama</u> :	cattle
<u>S. gallinarum</u> - <u>pullorum</u> :	poultry	<u>S. typhi-murium</u> :	cattle, pigs, pigeons,
<u>S. lexington</u> :	rabbits		other birds including canaries,
			horses, dogs, and rabbits

Additional bacteriological examinations have been made on kangaroo meat which has previously been recognized as frequently contaminated with salmonella organisms. The following serotypes have been recovered from kangaroo meat during the previous year: S. chester, S. jangwani, S. muenchen, S. ohlstedt, S. potsdam, S. rubislaw, and S. welikade. Placing of an embargo on importation of kangaroo meat which is infected with salmonellae is under consideration.

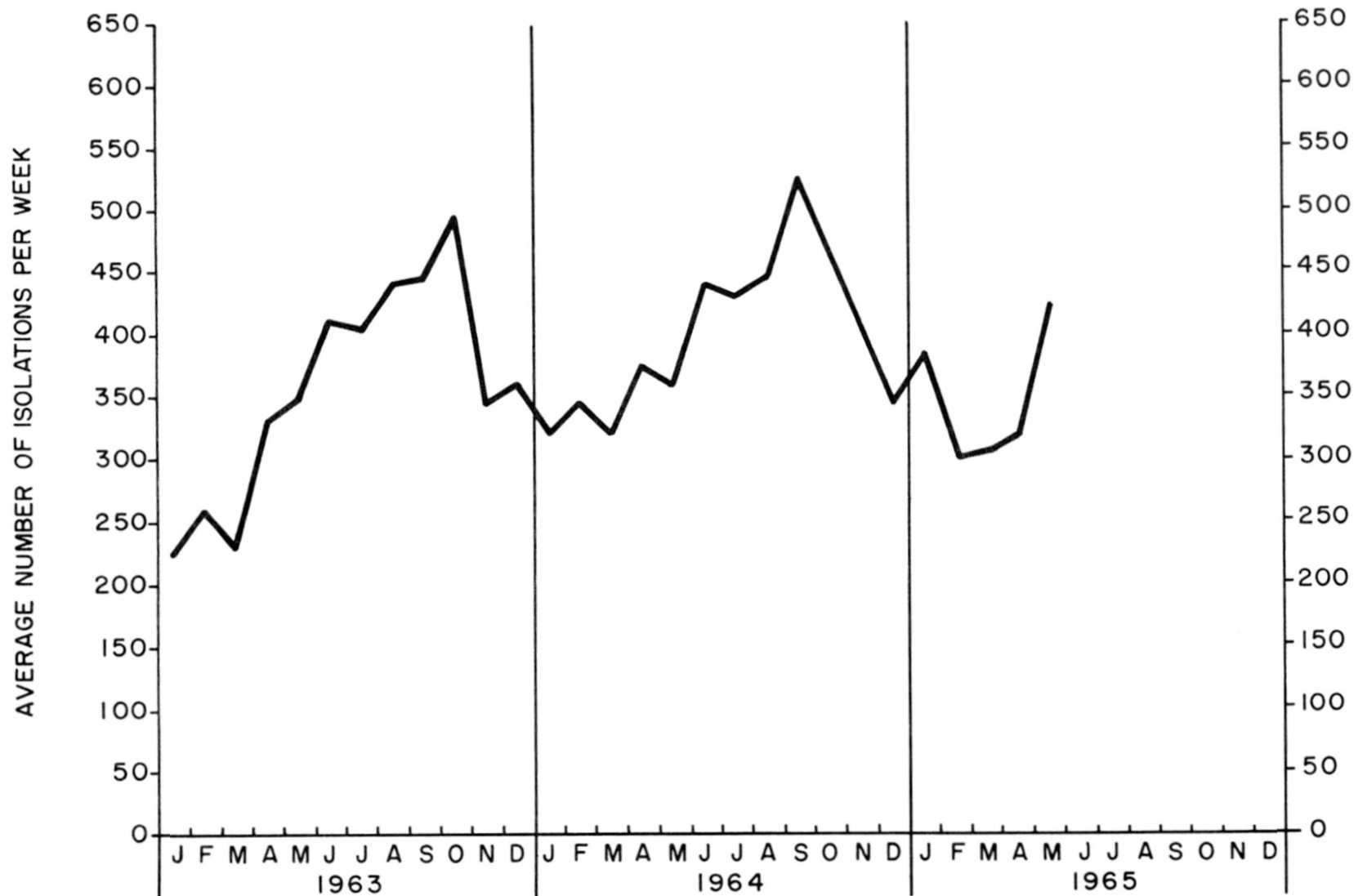
Occasional isolations of salmonella organisms have been made during periodic examinations of ponds in the city of Brussels and surrounding areas. Isolations of S. typhi-murium and S. typhi-murium var. copenhagen have occasionally been made during winter months, and exclusively from those waters which are frequented by migratory birds, especially wild canaries. Salmonella organisms have not been isolated from these waters during summer months when migratory birds are not commonly in the area. Accordingly, it is suggested that the source of contamination of these waters is periodical presence of migratory aquatic birds.

## VII. FOOD AND FEED SURVEILLANCE

None.

*Figure 1.*

REPORTED HUMAN ISOLATIONS OF SALMONELLAE  
IN THE UNITED STATES





*Figure 2*

EPIDEMIC CURVE - HOUSE TO HOUSE SURVEY  
PRIMARY CASES ALL AGES  
RIVERSIDE, CALIFORNIA

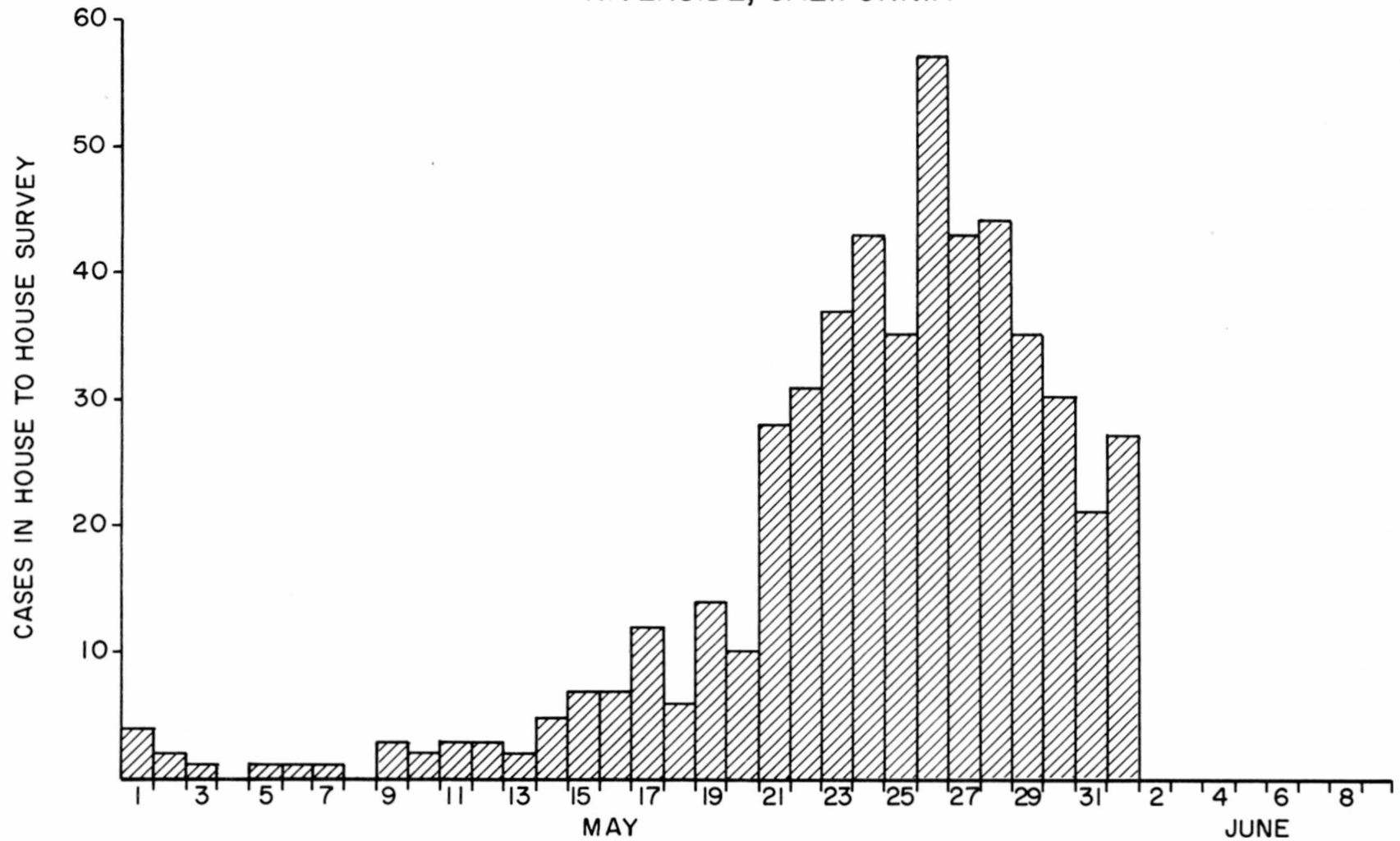




TABLE I  
SALMONELLA SEROTYPES ISOLATED FROM HUMANS DURING MAY, 1965

REGION AND REPORTING CENTER																			
SERO TYPE	NEW ENGLAND							MIDDLE ATLANTIC						EAST NORTH CENTRAL					
	MAINE	NH	VT	MASS	RI	CONN	TOTAL	NY-A	NY-BI	NY-C	NJ	PA	TOTAL	OHIO	IND	ILL	MICH	WIS	TOTAL
adelaide								1					1						
anatum				1		1	2		1		1	1	3			4		1	4
bareilly												2	2					1	1
berta				1			1			1	1		2				1		1
bilthoven																	1		1
binza				1			1												
blockley				2			2				2	2	4		1	1	1		3
bovis-morbificans				2			2												
braenderup					2		2	1		1			2			1			1
bredeney												1	1						
california																1			1
cerro																			
chester																	1	1	2
cholerae-suis v kun																	1		1
colorado																			
cubana				6			6							2		3	1		6
derby			1	6	2	5	14	6	4	2		23	35	1		7	5		13
emek																			
enteritidis				4		1	5	1	4	4	11	4	24	6	1	4	7	1	19
florida																			
give						1	1								8				8
hartford																			
heidelberg				13		4	17		4	4	3	5	12	2	3	12	5	7	29
infantis				6		1	7	4	1	2		4	11	2	2	5	4	1	14
inverness																			
java						1	1												
javiana						1	1								2				2
kentucky												1	1						
lindenburg																			
litchfield				1			1	1					1						
livingstone																			
loma-linda																			
lomita																			
london										1			1						
manhattan								1		1			2			1			1
meleagridis																			
miami															4				4
minnesota																			
mishmarhaemek																			
mission																			
montevideo				3		1	4	1				5	6			3	1		4
muenchen				1			1					1	1			1			1
new-brunswick																			
newington												1	1				1		1
newport				3	1	1	5	3	3		1	5	12	7	1	4	3	5	20
norwich													1						1
nottingham									1								1		
oranienburg																			
oslo				1		1	2												
panama				1			1	3					3		1			6	6
paratyphi A																			
paratyphi B				2			2	1		2	3	2	8	2		3			5
pensacola																			
poona																			
poona																			
reading								1					1						
remo													1						
saint-paul				13		2	15	1	5	4	1	1	12	1		1	3		5
san-diego									1				1						15
schwarzengrund														1		2	1	14	4
senftenberg																			
tennessee								1	1	3		2	7	2		1	1		4
thompson				1		1	2		1		1	4	6				4		4
typhi						1	1	1	2	4		1	8	9	2				11
typhi-murium	3			68	5	8	84	30	12	32	17	31	122	20	8	12	4	13	57
typhi-murium v cop				1			1				4		4				3		3
urbana				1		1	2												
weltevreden																			
worthington																			
untypable group B					2		2			2			2						
untypable group C-1																			
untypable group C-2																			
untypable group D																			
untypable group E					1		1												
untypable group G																			
unknown																		11	11
TOTAL	3	-0-	1	138	13	31	186	57	43	59	47	92	298	56	33	66	49	60	264

New York (A-Albany, B-Beth Israel Hospital, C-City)

\*The Beth-Israel Salmonella Typing Center in New York is a reference laboratory and processes many cultures from other states which are assigned to the respective states although reported by N.Y.-B.I. BI reported 143 isolates during May.

TABLE I (Continued)  
BY SEROTYPE AND REPORTING CENTER

REGION AND REPORTING CENTER																			
WEST NORTH CENTRAL								SOUTH ATLANTIC											S E R O T Y P E
MINN	IOWA	MO	ND	SD	NEBR	KAN	TOTAL	DEL	MD	DC	VA	WV	NC	SC	GA	FLA	TOTAL		
1		1					2				4 1		1 1		1 2	2 1	8 5	adelaide anatum bareilly berta bilthoven	
1						1	1						2		2		4	binza blockley bovis-morbificans braenderup bredeney	
1							1				1				1	1	1	california cerro chester cholerae-suis v kun colorado	
1							1		1	1	2	1			1	1	1	cubana derby emek enteritidis florida	
2							2								1		1	give hartford	
1							1				1				2		2	heidelberg	
1		3				7	11			2	1	6			3	5	8	infantis inverness	
1		1	1				2		2						1	3	6	java javiana kentucky lindenbug litchfield	
1			1				2								2	2	4		
															1		1	livingstone loma-linda lomita london manhattan	
										2	1				1	4	3 5	meleagridis miami minnesota mishmarhaemek mission	
3	1	1				1	1	1			1		4		4	7	17	montevideo muenchen new-brunswick newington newport	
2						1	3								1		1	norwich nottingham oranienburg oslo panama	
											2	2			1		4	paratyphi A paratyphi B pensacola pomona poona	
											1				1		2	reading remo saint-paul san-diego schwarzengrund	
2		2				7	4		1						3		3	senftenburg tennessee	
12	1	2 8		1		17	7 2 2 39	2	3 2	2	1 21	1 1		4	1	15	7	5 6 6 75	thompson typhi typhi-murium
																		typhi-murium v cop urbana weltevreden worthington untypable group B	
										10						1	11		
											3 5					1	3 6	untypable group C-1 untypable group C-2 untypable group D untypable group E untypable group G	
										3							3	unknown	
28	2	19	2	1	-0-	36	88	7	55	34	54	4	27	1	67	59	308	TOTAL	

TABLE I (Continued)

S E R O T Y P E	R E G I O N A N D R E P O R T I N G C E N T E R																		
	E A S T S O U T H C E N T R A L					W E S T S O U T H C E N T R A L					M O U N T A I N								
	KY	TENN	ALA	MISS	TOTAL	ARK	LA	OKLA	TEX	TOTAL	MONT	IDA	WYO	COLO	NM	ARI	UTAH	NEV	TOTAL
adelaide																			
anatum																			
bareilly				1	1	1	3	2	2	5						2			2
berta							3			6									
bilthoven																			
binza																			
blockley			2		2		2		1	3									
bovis-morbificans																			
braenderup							1			1									
bredeley									5	5									
california								1		1									
cerro																			
chester		2			2														
cholerae-suis v kun		1			1														
colorado																			
cubana		3			3														
derby		1			1		3			3									
emek																			
enteritidis							1			1									
florida																			
give							2			2									
hartford			1		1														
heidelberg		2	2		4		4			4	2						2		4
infantis			1		1		1	3	1	5	1								1
inverness																			
java																			
javana						1	3			3	1						1		2
kentucky							2			3									
lindenbug														1					1
litchfield							1			1									
livingstone	1				1														
loma-linda																			
lomita							1			1									
london																			
manhattan																			
meleagridis																			
miami																			
minnesota																			
mishmarhaemek									1	1									
mission																			
montevideo							2		2	4							3		3
muenchen		2			2		1	1	1	3				1					1
new-brunswick																			
newington									1	1									
newport		2	1		3	2	3		3	8								1	1
norwich																			
nottingham						1				1									
oranienburg			1		1			4	12	16	1	1							2
oslo																			
panama							1		1	2						1			1
paratyphi A																			
paratyphi B												1							1
pensacola																			
poona																			
poona																			
reading							1			1									
remo																			
saint-paul							4	1		5						1			1
san-diego						1				1				1		1			2
schwarzengrund																			
senftenberg																			
tennessee							2		1	3				1					1
thompson						1	2		3	6							1		1
typhi	1	4		2	7	1	4		2	7	2				1		1		4
typhi-murium	1	7	2		10		4	6	11	21		6		4		1	1	1	13
typhi-murium v cop						1	2			3	2					1			3
urbana																			
weltevreden																			
worthington																			
untypable group B				1	1										11	1			12
untypable group C-2																			
untypable group C-2				1	1										3				3
untypable group D															1				1
untypable group E															2				2
untypable group G																1			1
unknown				2	2														
TOTAL	3	24	10	7	44	9	53	18	47	127	9	8	-0-	8	19	8	9	2	63

TABLE I (Continued)

REGION AND REPORTING CENTER						OTHER VI	TOTAL	PERCENT OF TOTAL	FIVE MONTH TOTAL	% FIVE MONTH TOTAL	1964 5 MO. TOTAL	% 1964 5 MO. TOTAL	S E R O T Y P E
P A C I F I C													
WASH	ORE	CAL	ALASKA	HAWAII	TOTAL								
1	1	4		5	11		1	2.1	1	1.7	78	1.0	adelaide anatum bareilly berta bilthoven
							35		121		44		
							17		36		23		
							4		14				
							1		2				
2		3		2	2		3	1.3	4	1.8	179	2.3	binza blockley bovis-morbificans braenderup bredeney
							22		128		6		
							2		6		32		
							11		34		105		
							4		56				
		1		1	1		3		10		13		california cerro chester cholerae-suis v kun colorado
							1		3		26		
							7		59		14		
							3		15				
							1		2				
1 1	1	2		1	1		17	4.6	76	4.4	24	19.2	cubana derby emek enteritidis florida
							5		320		1,466		
							1		1				
							79		370		245		
							1		2		1		
11	15 1	27 8 1	1	1	1		15	8.4	46	8.1	24	7.6	give hartford heidelberg infantis inverness
							3		12		7		
							141		581		585		
							87		409		344		
							1		1				
1		2		2	2		16		65		94		java javiana kentucky lindenburg litchfield
							10		47		51		
							1		5		9		
							1		1				
							7		41		20		
	1			1	1		2		15		2		livingstone loma-linda lomita london manhattan
							1		1				
							1		1				
							1		1				
							5		40		71		
							3		8		11		meleagridis miami minnesota mishmarhaemek mission
							5		28		18		
							4		6		4		
							1		2				
							1		5				
1	1	2 1 1		1	3		42	2.5	190	2.6	168	2.2	montevideo munchen new-brunswick newington newport
							2		68		89		
							1		2				
							4		20				
							12		78		287		
3	1	6 1 2		5	7		3	2.2	7	3.1	2	2.9	norwich nottingham oranienburg oslo panama
							1		1				
							37		222		220		
							7		10		76		
							18		57				
3		1			1		1		4		3		paratyphi A paratyphi B pensacola pomona poona
							23		77		73		
							1		2				
							1		2				
							3		18		13		
1 1 1	1	8 5			10		4	3.4	6	3.7	15	1.9	reading remo saint-paul san-diego schwarzengrund
							1		2				
							58		265		149		
							27		139		68		
							1		6		30		
3 1 1 27	1 5 3	1 2 6 64		17	4		3	1.7	23	1.4	44	2.5	senftenberg tennessee thompson typhi typhi-murium
							28		98		189		
							36		163		124		
							58		321		246		
							532		2,123		1,958		
	1	1 1 1			1		14		78		69		typhi-murium v cop urbana weltevreden worthington untypable group B
							2		5		8		
							1		11		9		
							1		16		27		
							30		101		101		
	2		1		1		3		28		25		untypable group C-1 untypable group C-2 untypable group D untypable group E untypable group G
							2		24		11		
							6		14		8		
							9		11				
							1		3				
	1				1		17		51		31		unknown
56	36	174	2	35	303		1,681		7,206		7,652		TOTAL

(VI - Virgin Islands)

TABLE I-A  
SERTYPES REPORTED FROM HUMANS PREVIOUSLY DURING 1965  
BUT NOT IN MAY

Serotypes	Month(s)	Reporting Center(s)	Number of Isolations
alachua	Mar	Mass	1
albany	Jan-Feb	Ill(2)	
	Feb	Conn(1)	3
blegdam	Feb	SD	1
carrau	Jan	La	1
cholerae-suis	Jan-Apr	Ohio	2
corvallis	Feb	Hia	1
daytona	Mar	Tenn	1
denver	Feb	La	1
dublin	Feb-Mar-Apr	Calif	3
duesseldorf	Jan	Ohio(1)	
	Apr	La(1)	2
essen	Feb	Colo	1
fayed	Mar	NC	1
fresno	Mar	Tenn	1
gaminara	Mar	Tex(2)	
	Apr	NY-C(1)	3
hilbron	Jan	Mo	1
indiana	Jan-Feb	Mich(2)	
	Jan	DC(1)	
	Mar-Apr	Pa(6)	
	Mar-Apr	Ill(2)	
	Mar	Mass(2)	
	Mar	NJ(1)	
	Mar	NC(1)	15
irumu	Jan-Feb-Mar	Mo(3)	
	Feb	Colo(1)	4
kaapstad	Feb	Colo	1
kottbus	Feb	NY-A(3)	
	Feb	Colo(1)	
	Mar	Ind(1)	5
lexington	Feb	Calif	1
luciana	Jan	Ariz	1
madelia	Mar	Pa(1)	
	Mar	Fla(1)	2
mississippi	Jan-Mar	La(3)	
	Jan	Calif(1)	
	Feb	Ill(2)	
	Mar	Ga(1)	7
muenster	Mar	Calif	1
ohio	Feb	Conn(1)	
	Feb	Wisc(1)	2
rubislaw	Jan	La	2
siegburg	Jan	Ill(1)	
	Apr	NY-C(1)	2
stanley	Jan	Kan(1)	
	Apr	Ill(1)	2
taksony	Jan	NY-BI	1
thomasville	Jan	NJ	1
virchow	Jan	Colo	1
westhampton	Feb	Mass	1
TOTAL			72

**TABLE II**  
**REPORTED ISOLATIONS OF *S. TYPHI* BY PATIENT STATUS - MAY 1965**

STATE	REPORTED TO SALMONELLA SURVEILLANCE UNIT								CLINICAL CASES REPORTED	
	CASES		CARRIERS		UNKNOWN		TOTAL		IN MMWR	
	May	1965 Cuml.	May	1965 Cuml.	May	1965 Cuml.	May	1965 Cuml.	May	1965 Cuml.
UNITED STATES	16	66	18	112	24	143	58	324	35	140
NEW ENGLAND	—	—	1	7	0	5	1	6	—	7
Maine	—	—	—	—	—	2	—	2	—	—
New Hampshire	—	—	—	—	—	—	—	—	—	—
Vermont	—	—	—	—	—	—	—	—	—	—
Massachusetts	—	—	—	—	—	1	—	1	—	1
Rhode Island	—	—	—	—	—	2	—	2	—	—
Connecticut	—	—	1	7	—	—	1	7	—	—
MIDDLE ATLANTIC	5	14	0	11	3	13	8	38	8	25
New York	5	14	—	5	2	8	7	27	6	19
New Jersey	—	—	—	—	—	4	—	4	—	2
Pennsylvania	—	—	—	6	1	7	1	7	2	4
EAST NORTH CENTRAL	6	9	4	25	1	12	11	46	4	19
Ohio	6	7	2	15	1	2	9	24	3	6
Indiana	—	—	2	9	—	4	2	13	—	4
Illinois	—	—	—	—	—	6	—	6	1	4
Michigan	—	2	—	7	—	—	—	3	—	3
Wisconsin	—	—	—	—	—	—	—	—	—	2
WEST NORTH CENTRAL	0	7	2	10	0	10	2	18	—	3
Minnesota	—	—	—	7	—	—	—	7	—	—
Iowa	—	—	—	—	—	—	—	—	—	—
Missouri	—	7	2	9	—	6	2	13	—	3
North Dakota	—	—	—	—	—	—	—	—	—	—
South Dakota	—	—	—	—	—	—	—	—	—	—
Nebraska	—	—	—	—	—	—	—	—	—	—
Kansas	—	—	—	—	—	4	—	4	—	—
SOUTH ATLANTIC	1	15	3	21	2	10	6	46	6	32
Delaware	—	—	—	—	—	—	—	—	—	3
Maryland	—	2	1	3	1	6	2	11	1	9
District of Columbia	—	—	—	—	—	—	—	—	—	—
Virginia	1	2	—	2	—	—	1	4	1	3
West Virginia	—	2	1	4	—	—	1	6	—	7
North Carolina	—	8	—	4	—	7	—	13	1	8
South Carolina	—	—	—	—	—	—	—	—	1	4
Georgia	—	—	—	7	1	2	1	3	1	2
Florida	—	7	1	7	—	7	1	9	1	2
EAST SOUTH CENTRAL	1	3	5	15	1	14	7	32	3	15
Kentucky	—	—	—	7	1	3	1	4	1	6
Tennessee	1	3	3	6	—	7	4	10	—	3
Alabama	—	—	—	—	—	—	—	—	1	3
Mississippi	—	—	2	8	—	10	2	18	1	3
WEST SOUTH CENTRAL	3	21	3	25	1	7	7	53	4	18
Arkansas	—	4	—	6	1	3	1	13	2	8
Louisiana	1	6	3	14	—	2	4	22	—	2
Oklahoma	—	7	—	7	—	7	—	3	1	2
Texas	2	10	—	4	—	7	2	15	1	6
MOUNTAIN	—	3	—	3	4	22	4	28	2	13
Montana	—	—	—	—	2	3	2	3	—	—
Idaho	—	—	—	—	—	—	—	—	—	—
Wyoming	—	—	—	—	—	—	—	—	—	7
Colorado	—	—	—	—	—	—	—	—	—	—
New Mexico	—	3	—	3	1	17	1	23	1	8
Arizona	—	—	—	—	1	2	1	2	1	4
Utah	—	—	—	—	—	—	—	—	—	—
Nevada	—	—	—	—	—	—	—	—	—	—
PACIFIC	—	—	—	7	12	53	12	54	8	14
Washington	—	—	—	—	1	2	1	2	—	7
Oregon	—	—	—	7	5	9	5	10	2	3
California	—	—	—	—	6	41	6	47	6	9
Alaska	—	—	—	—	—	—	—	—	—	—
Hawaii	—	—	—	—	—	7	—	7	—	7
Virgin Islands	—	—	—	—	—	—	—	—	*	*

\*Does not report.

TABLE III

## Infrequent Serotypes

<u>Serotype</u>	<u>Center</u>	<u>May</u>	<u>1965*</u>	<u>Total</u> <u>1963 &amp;</u> <u>1964**</u>	<u>Comment</u>
<u>S. adelaide</u>	NY	1	1	6	Carrier status with this serotype has been described in rats and lizards in Australia.
<u>S. bilthoven</u>	MICH	1	2	0	Second isolate reported to this unit.
<u>S. colorado</u>	HAI	1	2	3	Three of 5 isolates in 1963-65 from HAI; 2 from FLA.
<u>S. florida</u>	FLA	1	2	8	Formed 4 per cent of a group of 553 salmonella carriers in Australia.
<u>S. inverness</u>	CALIF	1	1	0	Two of 4 nonhuman isolations in 1963-64 from cold-blooded vertebrates.
<u>S. lindenburg</u>	COLO	1	1	2	One of 2 1963 isolates also from COLO.
<u>S. london</u>	NY	1	1	4	Nonhuman isolates from poultry and whole eggs.
<u>S. loma-linda</u>	ORE	1	1	11	All isolations on record from CALIF, ORE, and ARIZ.
<u>S. lomita</u>	LA	1	1	4	All isolates from LA.
<u>S. mishmar-haemek</u>	TEX	1	2	1	First isolation reported from TEX; previous 2 from CALIF.
<u>S. new-brunswick</u>	CALIF	1	2	10	First isolated in 1936 from a baby chick in NJ.
<u>S. nottingham</u>	ARK	1	1	0	First reported isolate; no source could be determined.
<u>S. pensacola</u>	NC	1	2	15	First isolated in FLA in 1945.
<u>S. pomona</u>	CALIF	1	2	1	First isolated in CALIF in 1941; has been reported from snakes.
<u>S. remo</u>	PA	1	2	0	Second isolate reported in this country; first from VA earlier this year.

\* Represents 7,206 human isolations of salmonellae during the first 4 months of 1965.

\*\* Represents 39,762 human isolations of salmonellae during 1963 and 1964.

TABLE IV

Age and Sex Distribution of 1,646 Isolations of Salmonellae  
Reported for May 1965

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>%</u>	<u>Cumula- tive %</u>
Under 1	86	73	159	14.8	14.8
1-4 yrs.	176	126	302	28.0	42.8
5-9 yrs.	72	76	148	13.7	56.5
10-19 yrs.	60	46	106	9.8	66.3
20-29 yrs.	32	49	81	7.5	73.8
30-39 yrs.	25	33	58	5.4	79.2
40-49 yrs.	22	43	65	6.0	85.2
50-59 yrs.	30	36	66	6.1	91.3
60-69 yrs.	12	28	40	3.7	95.0
70-79 yrs.	7	29	36	3.3	98.3
80 +	5	11	16	1.5	99.8
Unknown	<u>285</u>	<u>284</u>	<u>569</u>		
Total	812	834	1,646		
% of Total	49.3	50.7			



TABLE V  
REPORTED NONHUMAN ISOLATES BY SEROTYPE AND SOURCE, \*MAY, 1965

S E R O T Y P E	chicken	turkey	duck	pigeon	domestic fowl environment	parrot	quail	blackbird	sparrow	equine	bovine	porcine	domestic animal unknown	canine	mouse	guinea pig	rabbit	monkey	chimpanzee	beaver	egg	powdered egg	frozen egg	powdered egg yolk	frozen egg products	chicken products	pork	chicken salad	noodles	poultry feed unknown	bone meal/ meat scraps	animal feed unknown	turtle	turtle water	stuffed easter ducks & chicks	yeast products	unknown	Total	5 mos Total	S E R O T Y P E	
anatum	5	9			1					1		3										1			1									1	21	84	anatum				
bareilly	2																																	1	2	14	bareilly				
berta	1	1					1																												2	3	berta				
binza	1	1																																1	3	17	binza				
blockley	1	2																																	4	66	blockley				
braenderup	2																																			2	6	braenderup			
bredeney	1	2																																		2	27	bredeney			
california	1	4																																		5	27	california			
cerro																																				4	33	cerro			
chester	1	8																																		9	67	chester			
cholerae-suis v kun												11																									11	46	cholerae-suis v kun		
cubana		1																																			2	11	cubana		
derby	2	4	1															1																		11	39	derby			
dublin											3																										3	22	dublin		
enteritidis																																					2	14	enteritidis		
gallinarum	2																																				2	14	gallinarum		
give	1	3	9																																		23	65	give		
heidelberg	19	21									1	2	1										2				1									57	292	heidelberg			
illinois																																					1	2	illinois		
indiana	1	2	1																																		4	16	indiana		
infantis	10	2																				1	1	1		2	5	2									24	140	infantis		
java																																					3	9	java		
kentucky		1																																			3	15	kentucky		
livingstone	7	2																																			20	56	livingstone		
manhattan	2	3																																			5	25	manhattan		
meleagridis		3																																				3	15	meleagridis	
menston																																					1	2	menston		
montevedio	9	1									1	2															2										16	81	montevedio		
muenchen	1	1																																			3	18	muenchen		
newington	4																																				4	16	newington		
newport		3									1	1																										7	39	newport	
oranienburg		1																					2														5	32	oranienburg		
paratyphi-B																																					3	4	paratyphi-B		
pullorum	33																																				33	128	pullorum		
reading		6																																			6	26	reading		
saint-paul	2	12																																				18	89	saint-paul	
san-diego		8																																			8	46	san-diego		
schwarzengrund	3	7										1																									13	36	schwarzengrund		
senftenberg		5																																			6	30	senftenberg		
siegburg																																					1	1	siegburg		
tennessee		3																																				12	44	tennessee	
thompson	9	6																																			16	74	thompson		
typhi-murium	3	7				2		1	11	21		1				1	1	1			1					1	1	1		1	2					59	311	typhi-murium			
typhi-murium v cop	10	2		1			2		2																												19	117	typhi-murium v kun		
urbana																																					1	3	urbana		
worthington		9																	1				1														11	34	worthington		
untypable group B																																					2	7	untypable group B		
untypable group C-1																																					4	9	untypable group C-1		
TOTAL	131	139	12	1	1	2	1	2	1	15	27	21	1	1	1	2	1	1	1	1	1	12	4	3	3	1	11	5	1	4	1	6	5	10	7	19	2	19	476	2,356	TOTAL

Source: National Animal Disease Laboratory, Ames, Iowa and Weekly Salmonella Surveillance Reports from Individual States.

\* Includes April late reports.

TABLE VI  
REPORTED NONHUMAN ISOLATES BY SEROTYPE AND STATE MAY\*\*, 1965

S E R O T Y P E	Ala	Ariz	Ark	Calif	Colo	Conn	Fla	Ga	Ill	Ind	Iowa	Kan	Ky	La	Me	Md	Mass	Mich	Minn	Miss	Mo	NH	NJ	NM	NY-A*	NY-BI*	NC	Ohio	Okla	Ore	Pa	SC	SD	Tenn	Tex	Utah	Va	Wash	Wisc	Total	5 Mos Total	S E R O T Y P E			
anatum				4		1	3			2						1			1	1	1		1							1				5			2		21	84	anatum				
bareilly								1																																2	14	bareilly			
berta																					1																			2	3	berta			
binza	1			1																	1																				3	17	binza		
blockley				2						1											1																				4	66	blockley		
braenderup	1							1												1																					2	6	braenderup		
bredeney				1																1																					2	27	bredeney		
california							1												4									1													5	27	california		
cerro																1			2																1						4	33	cerro		
chester		2								3												1							1												9	67	chester		
cholerae-suis v kun	1						4			4																								1	1							11	46	cholerae-suis v kun	
cubana				1												1																										2	11	cubana	
derby				1			1	1				1				3				4																						11	39	derby	
dublin				3																																						3	22	dublin	
enteritidis						1																1																				2	14	enteritidis	
gallinarum							4				1						3						1																			2	14	gallinarum	
give													9	1			7			2	1	1			1								1								23	65	give		
heidelberg	5	1		19				11			1												2								2			1	2							57	292	heidelberg	
illinois																																										1	2	illinois	
indiana	1									2									1																							4	16	indiana	
infantis		1		4		1				4		5		1			4			1			1								1												24	140	infantis
java						2	1																																			3	9	java	
kentucky				1																1																						3	15	kentucky	
livingstone	1			2		3														1	1	7																			20	56	livingstone		
manhattan	1			3						1																			2													5	25	manhattan	
meleagridis				1						2																																	3	15	meleagridis
menston																																											1	2	menston
montevideo	1			3			3	4									2																										16	81	montevideo
muenchen								1																																			3	18	muenchen
newington				4																1																						4	16	newington	
newport		1		2		1				2	1												1																				7	39	newport
oranienburg							1									1											1																5	32	oranienburg
paratyphi-B																																											3	4	paratyphi-B
pullorum	4		2					2		1	1								1												7												33	128	pullorum
reading				6																																							6	26	reading
saint-paul				15							3																																18	89	saint-paul
san-diego				5																																							8	46	san-diego
schwarzengrund	3			5				1		1																																	13	36	schwarzengrund
senftenberg				1																																							6	30	senftenberg
siegburg																			1																								1	1	siegburg
tennessee						1														3																							12	44	tennessee
thompson	4						1		1		4								5			1																				16	74	thompson	
typhi-murium		1		23	1				3	1	2	1	3				2		1																								59	311	typhi-murium
typhi-murium v cop									2	2	2					3			3		3	1	3																				19	117	typhi-murium v cop
urbana						1																																					1	3	urbana
worthington				1															1	8																							11	34	worthington
untypable group B																																											2	7	untypable group B
untypable group C-1									1																																		4	9	untypable group C-1
TOTAL	23	6	2	109	1	16	19	24	4	33	4	9	9	4	5	6	19	7	39	16	9	1	9	1	1		1	7	5	7	11	6	7	5	4	6	6	15	14	6	476	2,356	TOTAL		

Source: National Animal Disease Laboratory, Ames, Iowa and Weekly Salmonella Surveillance Reports from Individual States.

\*\*Includes April late reports.

\* NY-A (New York - Albany) NY-BI (New York - Beth Israel)

TABLE VI-A  
SEROTYPES REPORTED FROM NONHUMAN SOURCES  
PREVIOUSLY DURING 1965 BUT NOT IN MAY

Serotype	Month(s)	Reporting Center(s)	Number of Isolations
alachua	Jan-April	Calif(3)	
	Feb	Ind(1)	
	Feb	Minn(4)	
	Feb	Tex(1)	
	Feb	Utah(2)	11
albany	Feb	Tex(1)	
	Mar	Ind(1)	2
brandenburg	Jan	NC	1
cambridge	April	Ind	1
duesseldorf	April	Mass	1
florida	Jan	Ill	1
goerlitz	Jan	Wash	1
hartford	Apr	Minn	1
javana	Jan	Fla(1)	
	Mar	Calif(1)	2
johannesburg	Mar	Utah	1
lexington	Jan	Tenn	1
manila	Apr	Tenn	1
miami	Feb	Minn(1)	
	Feb	Mo(1)	
	Apr	Mich(1)	3
mikawashima	Mar	Ind	1
minnesota	Jan-Mar	Ala(5)	
	Jan	Ill(1)	
	Feb	Calif(1)	
	Feb	Md(1)	
	Mar	Minn(1)	
	Mar	Tex(1)	
	Apr	Alas(1)	11
mission	Jan	Ark(1)	
	Jan	SC(1)	2
muenster	Jan-Mar	Fla(2)	
	Jan-Apr	Miss(2)	
	Mar	Ohio(1)	5
norwich	Feb	NC	1
orion	Jan	Miss(1)	
	Jan	Mont(1)	
	Mar	Minn(2)	4
oslo	Mar-Apr	Ill	4
panama	Feb-Mar	Ohio(2)	
	Mar	Tex(1)	3
pomona	Apr	Mich	1
poona	Jan	Tenn(1)	
	Mar	Calif(3)	
	Mar	Mass(3)	7
rubislaw	Apr	Mont	1
ruiru	Apr	Md	1
tallahassee	Jan	Fla	1
thomasville	Mar-Apr	Md(4)	
	Apr	Minn(1)	5
typhi-suis	Feb	Calif	1
wassenaar	Apr	Ill	1
westerstede	Jan	Miss	2
westhampton	Feb	Mass	1
TOTAL			79